

Claims

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1. Device for curing a coating of an object, in particular a vehicle body (12), the coating consisting of a material that cures under electromagnetic radiation, in particular of a UV lacquer or a thermally curable lacquer, comprising
 - 5 a) at least one emitter(48; 48') generating electromagnetic radiation;
 - b) a conveying system (14, 16) which conveys the object (12) into the vicinity of the emitter (48; 48') and away from it again;

characterised in that

the conveying system comprises a suspended carriage (16) which can be moved in a translatory manner along at least one travel way (14) and is suspended over the at least one emitter (48; 48'), and in that at least two downwardly extending suspension supports (66) for suspension of the object (12) are arranged one behind the other in the longitudinal direction (85) on a bogie truck (50) of the suspended carriage (16), the length of which supports can be changed independently of each other with the aid of a motor.

2. Device according to claim 1, characterised in that at least one of the suspension supports (66) comprises two belts (70) or chains which can be individually wound with the aid of a motor and which act on either side of the object (12) at a supporting structure (74) receiving the object (12).
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3. Device according to either claim 1 or 2, characterised in that the conveying system comprises a plurality of suspended carriages (16) which each comprise a separate driving unit (58) for a translatory movement along the travel way (14).
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4. Device according to any one of the preceding claims, characterised in that it comprises a container (38) that is open at the top and arranged below the travel way (14), and into the interior of which the object (12) can be introduced by an extension of the length of the suspension support (66) and of which the interior can be subjected to electromagnetic radiation from the at least one emitter (48; 48').
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5. Device according to claim 4, characterised in that at least one emitter (48) is fitted in a wall or the base (44) of the container (38).
6. Device according to claim 5, characterised in that at least one emitter (48) is fitted in the opposing
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- side walls (39) extending parallel to the translational movement of the objects (12) and in at least one of the two end walls (41) extending perpendicular to the translational movement of the objects or in the base (44) of the container (38).
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7. Device according to claim 5, characterised in that a large number of emitters (48) is arranged on all walls (39, 41) and in the base (44) of the container (38).
- 10 8. Device according to any one of the preceding claims, characterised in that a plurality of emitters (48') are provided in a U-shaped arrangement with two substantially vertical legs and a substantially horizontal base.
- 15 9. Device according to claim 8, characterised in that the arrangement of the emitters (48') at the substantially vertical legs is adapted to the course of the lateral surfaces of the object (12).
10. Device according to claim 8 or 9, characterised in that the arrangement of emitters (48') at the substantially horizontal base is adapted to the course of the downwardly oriented surface of the object (12).
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11. Device according to any one of claims 4 to 10,
characterised in that a protective gas can be
supplied to the interior of the container (38).
12. Device according to claim 11, characterised in that
the protective gas is heavier than air, in
particular is carbon dioxide.
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13. Device according to either claim 11 or 12,
characterised in that there is an inlet for the
protective gas in the immediate vicinity of the at
least one emitter (48; 48').
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14. Device according to any one of the preceding claims,
characterised in that at least one emitter (48; 48')
on the side remote from the object (12) is
associated with a moving reflector.
15. Device according to any one of claims 4 to 14,
characterised in that the container (38) is provided
on at least one inner surface with a reflective
layer (78).
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16. Device according to claim 15, characterised in that
the layer (78) is uneven.
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17. Device according to any either of claims 14 or 15,
characterised in that the layer consists of
aluminium foil (78).

18. Device according to any one of the preceding claims, characterised in that it comprises a cabin housing (28) which prevents the uncontrolled escape of gases and electromagnetic radiation.
- 5 19. Device according to claim 18, characterised in that a respective sluice (34, 36) is provided for the suspended carriage (16) at the inlet and outlet of the cabin housing (28).
- 10 20. Device according to either claim 18 or 19, characterised in that an apparatus (42) is provided for removing oxygen from the atmosphere within the cabin housing (28).
- 15 21. Device according to claim 20, characterised in that the apparatus (42) for removing oxygen comprises a catalyst for catalytically binding the oxygen.
22. Device according to either claim 20 or 21, characterised in that, for removing oxygen, the apparatus (42) comprises a filter for absorbing oxygen.
- 20 23. Device according to any one of claims 20 to 22, characterised in that, for removing oxygen, the apparatus (42) comprises a filter for adsorbing oxygen.

24. Device according to any one of the preceding claims, characterised in that it comprises a pre-heating zone (18) for removing the solvent from the material of the coating.

5 25. Device according to any one of the preceding claims, characterised in that it comprises a pre-heating zone (18) for initial gelling of powdery material.

10 26. Device according to any one of the preceding claims, characterised in that the device comprises a controller (90) via which the length of the suspension supports (66) can be automatically adapted to the vertical dimensions of the object (12).

15 27. Device according to claim 26, characterised in that the length of the suspension supports (66) can be changed by the controller (90) in such a way that, during a conveying movement of the object (12) past the at least one emitter (48; 48'), the quantity of electromagnetic radiation striking the material per unit of area and the intensity thereof do not fall below respectively predetermined thresholds required for curing.

20 28. Device according to claim 27, characterised in that the length of the suspension supports (66) can be changed by the controller (90) in such a way that,

during a conveying movement of the object (12) past the at least one emitter (48; 48'), the spacing in the vertical direction between the object (12) and the at least one emitter (48; 48') is at least approximately constant.

29. Device according to either claim 27 or 28,
characterised in that the controller (90) comprises
a memory (92) for storing three-dimensional shape
data of the object (12).

10 30. Device according to any one of the preceding claims,
characterised in that the device comprises a
measuring station (94) upstream of the at least one
emitter (48; 48') in the conveying direction, by
means of which station the three-dimensional shape
data of the object (12) can be detected.

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31. Device according to claim 30, characterised in that
the measuring station (94) comprises at least one
light barrier.

32. Device according to claim 31, characterised in that
the measuring station comprises at least one optical
sampler (96) by which the object (12) can be sampled
in a scanner-like manner in at least one direction.

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33. Device according to claim 32, characterised in that the optical sampler (96) comprises an infrared light source.
34. Device according to any one of claims 30 to 33,
5 characterised in that the measuring station comprises a video camera and an apparatus for digital image recognition.
35. Device according to any one of the preceding claims,
10 characterised in that it comprises a post-heating zone (22) to complete curing.
36. Device according to claims 11 and 19, characterised in that, within the inlet-side sluice (34), an inlet for protective gas is arranged in such a way that a cavity in the object (12) is flushed with a
15 protective gas.
37. Device according to any one of the preceding claims, characterised in that the electromagnetic radiation is UV light.
38. Device according to any one of the preceding claims,
20 characterised in that the electromagnetic radiation is IR radiation.